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ABSTRACT

THIS PROJECT USED SIX ENVIRONMENTAL VARIABLES IDENTIFIED BY DAVE (1963) AND WOLF (1964) AND THREE ADDITIONAL VARIABLES (IDENTIFICATION WITH MODELS, RANGE OF SOCIAL INTERACTION, AND PERCEPTION OF PRACTICAL VALUE OF EDUCATION) TO PREDICT ACADEMIC ACHIEVEMENT IN SIX-YEAR-OLD MEXICAN-AMERICAN CHILDREN FROM AN ECONOMICALLY DEPRESSED AREA. THE CHILDREN WERE DIVIDED INTO TWO GROUPS: THOSE WHO PERFORMED BEST AND THOSE WHO SCORED LOWEST ON CRITERION MEASURES BELIEVED TO PREDICT SCHOOL PERFORMANCE (GOODENOUGH-HARRIS DRAWING TEST AND VAN ALSTYNE PICTURE VOCABULARY TEST). CONCLUSIONS INDICATE THE VALIDITY OF ENVIRONMENTAL MEASURES AS PREDICTIONS OF SCHOOL PERFORMANCE. USEFULNESS OF THIS TYPE OF STUDY IS HELD TO BE FOR DESIGNING INTERVENTION PROGRAMS WHICH WILL IMPROVE THOSE QUALITIES OF THE HOME ENVIRONMENTS WHICH RELATE TO ACADEMIC ACHIEVEMENT. NOT AVAILABLE IN HARD COPY DUE TO MARGINAL LEGIBILITY OF ORIGINAL DOCUMENT. (KG)

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ENVIRONMENTAL VARIABLES AS PREDICTORS OF ACADEMIC PERFORMANCE

by

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ENVIRONMENTAL VARIABLES AS PREDICTORS OF ACADEMIC PERFORMANCE[1,2]

Background and Purpose

The purpose of this paper is to report results of an investigation designed to test the validity of selected environmental variables as predictors of academic success for young children from an ethnic minority. Secondarily, it is intended to place the investigation in the broader perspective of contemporary issues in social measurement and social action. In order to accomplish this latter purpose, it will be necessary to provide a more thorough description of related work than is customary in a paper of this kind.

It is a long established and well documented fact that characteristics of the natural environment, such as social class, are related to academic achievement and measures of intellectual status. The importance attributed to these variables is examplified by Miner's (1957) book entitled Intelligence in the United States, which identified social stratification as the major factor in intellectual differances. From his analysis of the relationships between vocabulary test scores and background variables, Miner concluded that his most striking result was ". . . that the major differences in mean scores appear on the variables that are related to social stratification, namely, education, occupation, race, and subjective class identification" (p. 64).

While such data clearly have social implications such as those associated with the inequality of educational opportunity, the value of this information in guiding intervention strategies is extremely limited, precisely because the variables do not lend themselves to manipulation, and because they are so gross. How does the information that a child's father had a very limited formal education help us to decide on procedures to imporve the child's own educational opportunities? What happens (or fails to happen) in the family experiences of a lower class child that makes it less probably that he willsucceed in school than will his middle class counterparts? And how can we account for the fact that a few children from backgrounds of severe poverty do very well indeed in school and society?

Our usual global social indices may obscure more than they reveal. Bloom (1964) has criticized the tendency to think of environments as bad or good. He attributes this inclination in our thinking to:

> . . . the very small number of environmental measures available and to the general tendency to think of wealth, high social position, and professional occupational status as being indices of good environments, whereas poverty, lower social position, and unskilled occupational status are regarded as indices of poor environments (p. 179).

Bloom goes on to say that:

> Although it is undoubtedly true that wealth favors the individual in many ways, it is quite possible that the lack of wealth may facilitate the development of certain characteristics (p. 189).

It is unlikely that the presence or absence of wealth is the important factor at all, but rather the experiences available to children reared in a family which has wealth are more likely to facilitate certain aspects of development. The few scales available for social measurement are primarily reflections of socio-economic status, and do indeed seem to encourage thinking about environments as either good or bad. They tell us nothing about the events which characterize a particular environment and which may have a relationship to particular individual characteristics, such as intellectual development. Wolf has warned that:

> . . . just as a general measure of intelligence or IQ has obscured many important differences among individuals, so a general index of social status or economic well-being has obscured many very important differences among environments. Such indices usually represent a summation of a number of symptoms or surface characteristics of an environment and, as such, give little information about the specific ways in which environmental factors might affect the development of specific behavioral characteristics.

It would be infinitely more helpful to conceive of the environment as Bloom (1964) has, ". . . in terms of the probability that it provides for selected experiences or interactions" (p. 187). This concern about the identification of more specific environmental influences on behavior is not new. Over 30 years ago, Newman and his associates (Newman, Freeman, & Holzinger, 1937) demonstrated the specificity of environmental effects, but until very recently there has been little additional effort in this direction. The

work is tedious and expensive. The difficult question is: How do we select from among the vast array of classes of events experienced by individuals in their natural envionments, those which warrant consideration? Investigators working within the framework of operant theory (see Baer, Wolf, & Risley, 1968), have used the procedures of functional analysis to produce useful general statements concerning mechanisms which shape various forms of individual behavior, and a few psychologists (e.g., Wetzel and Tharp, 1969; Gallimore and Howard, 1968) have applied these principles to the analysis of the natural environment. A major strength of this kind of analysis is that the independent variable is the behavior of socializing agents.

A somewhat analogous, but more inclusive, form of analysis of environmental influences on behavior was pioneered by Davé (1963) and Wolf (1964) at the University of Chicago. Their work focused on what parents did with their children. Their instruments included a focused interview schedule and rating scales which were intended to define and measure variables which were identified from the theoretical and empirical literature in learning, child development, and related areas. Although the data were based on parent report rather than direct observation, the results were impressive. In one of these investigations, the correlation between the overall environmental rating and school achievement was +.80, indicating that measures of what parents report doing with their

children can yield an accurate prediction of the child's success in school (Wolf, 1966).

This pair of investigations demonstrated that environmental variables focusing on behaviorally defined events in the natural environment display substantial relationships to concurrent measures of intelligence and academic achievement. The significance of these environmental variables and the techniques for measuring them would be further emphasized if it were established that they have predictive as well as concurrent validity for pupil performance, and that they are applicable to low achieving minority group children. The investigation reported here was designed to yield data bearing on these points.

Procedures

This investigation provides follow-up data on children who served as Ss in a study of environmental influences on the intellectual performance of six-year-old Mexican-American children (Henderson, 1966; Henderson and Merritt, 1968). Subjects in the original investigation were from Spanish speaking families of Spanish surname residing in predominantly Mexican-American neighborhoods which had been classified as economically depressed. They were selected from a population of 378 children who were destined for a pre-first grade program because they had been evaluated by school personnel as being unready to profit from the first grade program.

The children were divided into two groups; those who performed best and those who did most poorly on criterion measures which were assumed to predict school performance (Goodenough-Harris Drawing Test and Van Alstyne Picture Vocabulary Test).

The home environments of these children were measured on the six environmental process variables identified by Davé and Wolf, and on three additional variables postulated to be relevant for this population (identification with models, range of social interaction, and perception of practical value of education). A multivariate analysis (Hotelling's T^2) demonstrated that the home environments of children who did poorly on the criterion measures were significantly different ($P < .01$) from the home environments of children who did relatively better. The composite score for for the environmental ratings accounted for 36 per cent ($r = +.59$) of the variance in the composite criterion measure, and for 45 per cent ($r = +.67$) of the variance in vocabulary test performance. Warner's Index of Status Characteristics accounted for only 15 per cent ($r = +.37$) of the variance in composite criterion scores, and for 18 per cent ($r = +.43$) of the variance in vocabulary performance.

Considering a severe range restriction problem for both the environmental and pupil performance measures, these earlier data provided fairly convincing evidence of the validity of the environmental measures for concurrent performance measures.

For the present investigation, 37 of the 80 Ss from the original

study were located at the end of the third grade. California Reading Test scores were obtained for these Ss, and these scores were correlated against the original environmental ratings. The correlations between CRT total score and the environmental variables of achievement press (r= +.61), language models (r= +.46) academic guidance (r= +.45), activeness of family (r= +.54), identification with models (r= +.38), range of social interaction (r= +.39), and perceived value of education (r= +.39) were significant at the .01 level. CRT total score correlations with the variables of intellectuality in the home (r= +.35), and work habits in family (r= +.27) were significat at the .05 level.

Discussion

Wolf (1966) has indicated that a distinction between his and Davé's work and that of other investigators who have attempted to identify selected characteristics of environments is that most investigators have not related the environmental measures to individual data. Wolf and Davé, on the other hand, validated their environmental measures against measures of the individual characteristics which were postulated to be effected by the environmental factors.

The investigation reported here has gone a step further by illustrating moderate levels of predictive as well as concurrent validity for individual performance in school. Once predictive validity has been established, the greatest value of the instrument may be to generate hypotheses to be tested through intervention

procedures. Viewed for their diagnostic rather than their predictive value, those environmental measures which are related to school achievement can serve as a guide to the design of intervention programs to enhance the natural environments of disadvantaged children.

Such a framework for intervention is currently being developed for use in the parent involvement programs for those Follow Through projects which are using the Tucson Early Education Model (see Hughes, Wetzel, & Henderson, 1969). In our current work we have revised the environmental instrument in order to cast the variables into a framework that is more systematically related to learning theory. Preliminary factor analysis indicates extremely strong loadings on four of the five postulated learning variables. Intellectual measures have been collected on a sample of 148 disadvantaged first-graders to provide data on criterion-related validity. If the validity of the revised instrument holds up, the next step will be to use the content of the learning variables to guide the development of procedures for consulting to the natural environment, and to suggest hypotheses to be tested.

Rather than striving for better prediction, a major objective of this work is to <u>reduce</u> the magnitude of the relationship between base line environmental measures, and the eventual achievement of children, by improving the quality of those aspects of their natural environments that are related to academic achievement.

TABLE I

Correlations of Selected CRT Subtests
with Environmental Variables

Environmental Variables	California Reading Test						
	Word Form	Word recog-nition	Oppo-sites	Picture Asso-ciation	Part I Total	Part II Total	Total
Achievement Press	.31*	.53**	.62**	.60**	.60**	.59**	.61**
Language Models	.26	.43**	.35*	.45**	.45**	.45**	.46**
Academic Guidance	.28*	.44**	.34*	.42**	.45**	.43**	.45**
Activeness of Family	.31*	.49**	.48**	.50**	.53**	.53**	.54**
Intellectuality in Home	.19	.31*	.28*	.40**	.35*	.33*	.35*
Work Habits in Family	.08	.31*	.23	.27*	.27*	.27*	.27*
Identification with Models	.25	.33*	.38**	.30*	.37*	.39**	.38**
Range of Social Interaction	.09	.34*	.44**	.40**	.37*	.45**	.39**
Perceived Value of Education	.26	.30*	.41**	.38**	.40**	.35*	.39**

* Significant at .05 level
** Significant at .01 level
N = 37

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FOOTNOTES

1. This paper was presented at the Annual meetings of the Western Psychological Association, Vancouver, B.C., Canada, June 20, 1969.

2. The research reported herein was performed pursuant to a contract with the Office of Education, U.S. Department of Health, Education, and Welfare through the Arizona Center for Research and Development in Early Childhood Education, a component of the National Laboratory on Early Childhood Education. Contractors undertaking such work under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the work. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.